STATEMENT OF BASIS ADDENDUM
LA0120677, AI 127497

1. **The Applicant Is:** Magnolia Plantation Water System
Magnolia Plantation Water Treatment Plant
Post Office Box 960
Abbeville, Louisiana 70511

2. **Facility Type:** water treatment plant

3. **Application Received:** March 4, 2005

4. **Prepared By:** Molly Hebert

5. **Date Prepared:** July 28, 2005

6. **Permit Type:** Issuance of LPDES permit LA0120677
LPDES Draft permit issued: May 17, 2005

7. **Changes to Statement of Basis :**

A. Part 2.A. Facility Information

Lab data submitted by Magnolia Plantation on June 14, 2005 indicate a maximum chloride concentration of 8350 ppm and an average chloride concentration of 4765 ppm in the discharge.

B. Part 6.B. Compliance History/Comments

a. May 6, 2005 –A complaint was received regarding high chloride concentrations in Tigre Coulee. A property owner along an adjacent branch of the tributary system for Bayou Tigre was concerned about chlorides being discharged from the plant. The owner is using water from the Bayou Tigre watershed to irrigate rice. The owner was informed of the draft permit and asked to submit official comments to the Agency. On May 12, 2005, an inspection was conducted by surveillance. Four samples were taken downstream from the facility (one from the discharge and one from the irrigation pump). These samples showed chloride levels ranging from 280 ppm to 1340 ppm downstream from the facility

b. A follow up site visit was conducted on July 21, 2005 by Permits, Surveillance, and Engineering staff. Surface and depth samples were collected from 5 sites along the Bayou Tigre tributary system (see attached site visit report).

C. Rationale for Outfall 001.

Changes from those proposed in the Draft Permit of May 17, 2005 for the chloride limits on this Outfall are proposed due to new information regarding the condition and existing use of the receiving stream. Letters received during the comment period from the general public indicate that Agriculture is an existing use of the Bayou Tigre watershed. Per LAC 33.IX.1109.A, LDEQ must protect all existing uses of a receiving stream.

While LAC 33.IX.1123 does not include an in-stream chloride standard for this Subsegment, LDEQ has the authority to assign an appropriate standard. LAC 33.IX.1113.C.2 states in regards to chlorides, sulfates, and total dissolved solids, that for Subsegments "..that have no

listed criteria (ie, designated N/A), criteria will be established on a case-by-case basis using field determination of ambient conditions and the designated uses."

LDEQ has been made aware (through the public comment period) of 2 crops, rice and crawfish, that are cultivated in this drainage system. The upper watershed, while generally at low flow conditions, is used for irrigation following rain events. The salinity tolerance for rice is 600 ppm per the LSU AgCenter General Guide to Using Salt Water on Rice. This concentration is tolerable at all stages of rice growth. The salinity tolerance for crawfish is 1200 ppm per the LSU AgCenter Crawfish Production Manual. Levels above 1200 ppm will begin to affect spawning. **Therefore, in order to protect the existing Agricultural use of the receiving stream, the in-stream standard used to calculate the chloride limits for this facility has been set at 600 ppm.**

Current in-stream chloride concentrations have not been considered in these calculations per the Implementation Plan. In addition, this facility is located at the headwaters of the Bayou Tigre Watershed. As such there is no upstream chloride concentration. Background chloride levels are assumed to be zero. A reopener clause has also been included in this permit to allow adjustment if necessary based on future Total Maximum Daily Loads (TMDLs), Waste Load Allocations (WLAs), and/or revisions to the standard.

The Louisiana Surface Water Quality Standards Implementation Plan (version 4, September 27, 2001) states that "in cases where the critical flow is less than or equal to 0.1 cfs, 0.1 cfs shall be the default critical flow for streams not designated intermittent." In addition, the Implementation Plan states that for cases where the "harmonic mean flow is less than or equal to 1 cfs, 1 cfs shall be the default harmonic mean flow for streams not designated intermittent." The water quality calculations in the May 17, 2005 Draft Permit used a critical flow of 0 cfs and a harmonic mean of 1 cfs.

Data and visual evaluation of the receiving stream obtained by LDEQ permitting and field staff have established that this is not an accurate representation of the in-stream conditions. This facility is located at the headwaters of the watershed. As such, the receiving stream does not always have a flow and does not have long-term mixing potential. Per LAC33.IX.1115.7.c, "...specified flows will not be appropriate under some circumstances.....The Department may approve an alternative which is protective of designated uses, to be determined on a case-by-case basis." The harmonic mean value of 1 cfs is inappropriate for the conditions present in the receiving stream and shall not be included in the mixing zone calculations as described in LAC 33.IX.1115.C.8. Therefore, it has been set to 0 cfs in the new limitation calculations. LDEQ has concluded that the facility discharge will experience some mixing during rainfall events. As such, the Critical Flow value has been set to 0.1 cfs.

Finally, because these chloride limits are water quality based, a 3 year compliance schedule will be allowed per LAC 33. IX.1109.D.1. As this facility has been discharging to the watershed for approximately 10 years and per comment letters received by the Agency, farmers in this area do periodically experience high salinity levels due to natural conditions (intrusion), it is felt that "Report" requirements for this interim period are appropriate until plant upgrades are complete. Rice farmers in this area do have ground water pumps as an alternative to surface water irrigation.

Rationale for Magnolia Plantation Water Treatment Plant

Interim Limits – Permit Effective Date to 3 years after Effective Date

1. **Outfall 001** – filter backwash and floor rinse water (Flow = 0.0648 MGD)

Pollutant	Limitation Mo. Avg:Daily Max	Reference
Flow (GPD)	Report : Report	(*1)
TSS	30 : 45 mg/l	(*2), BPJ
Clarifying Agents Used	Report : Report	(*2), BPJ
Total Recoverable Iron	--- : Report	(*2), BPJ
Chlorides	**Report: Report**	**(*3)**
pH	6.0 su min. - 9.0 su max	(*2), BPJ

Treatment: Settling/Dilution Tank

****Monitoring Frequency:** Monthly for Flow, TSS, Clarifying Agent, Chlorides,and pH parameters
Quarterly for Total Recoverable Iron

****Limits Justification:**

Flow: Reporting of flow is required by LAC 33:IX.2361.I.1.b

TSS, Clarifying Agents, Total Recoverable Iron, pH: The limits for these parameters are based on the limits presented in Schedule B of the Potable Water Treatment Plant general permit. The Total Recoverable Iron monitoring requirement has been included because the facility is chlorinating to oxidize iron so that it can be removed in the Mn greensand filters. This iron may be leaving the facility in the discharge of filter backwash water.

Chlorides : Monitoring and reporting requirements have been included for the interim period based on LAC 33.IX.1109.D.1. Chloride limitations have not been included as per similar LPDES permit interim schedules for minor facilities. A progress report outlining the status of the facility improvements shall be submitted on a yearly basis until compliance is achieved.

(*1) LAC 33:IX.2361.I.1.b
(*2) Potable Water Treatment Plant General Permit, Issued January 1, 2005
(*3) Interim limits reporting schedule implemented per LAC 33.IX.1109.D.1 and per similar LPDES permit interim schedules for minor facilities.
BPJ Best Professional Judgment
GPD Gallons per Day
su Standard Units

Rationale for Magnolia Plantation Water Treatment Plant

Final Limits – 3 years after Effective Date to Permit Expiration Date

1. **Outfall 001** – filter backwash and floor rinse water (Flow = 0.0648 MGD)

Pollutant	Limitation Mo. Avg:Daily Max	Reference
Flow (GPD)	Report : Report	(*1)
TSS	30 : 45 mg/l	(*2), BPJ
Clarifying Agents Used	Report : Report	(*2), BPJ
Total Recoverable Iron	--- : Report	(*2), BPJ
Chlorides	**832 : 1975 mg/l**	**(*3), BPJ**
pH	6.0 su min. - 9.0 su max	(*2), BPJ

Treatment: Settling/Dilution Tank

****Monitoring Frequency:** Monthly for Flow, TSS, Clarifying Agent, Chlorides, and pH parameters
Quarterly for Total Recoverable Iron

****Limits Justification:**

Flow: Reporting of flow is required by LAC 33:IX.2361.I.1.b

TSS, Clarifying Agents, Total Recoverable Iron, pH: The limits for these parameters are based on the limits presented in Schedule B of the Potable Water Treatment Plant general permit. The Total Recoverable Iron monitoring requirement has been included because the facility is chlorinating to oxidize iron so that it can be removed in the manganese green-sand filters. This iron may be leaving the facility in the discharge of filter backwash water.

Chlorides: Please note the rationale presented above in section 7.C of this Addendum and the water quality screen in Appendix A-1

(*1) LAC 33:IX.2361.I.1.b
(*2) Potable Water Treatment Plant General Permit, Issued January 1, 2005
(*3) Appendix A-1, Water Quality Screen
BPJ Best Professional Judgment
GPD Gallons per Day
su Standard Units

Developer: Bruce Fielding Time: 12:54 PM

Software: Lotus 4.0 LA0120677, AI127497

Revision date: 02/14/05

Water Quality Screen for

Input variables:

Receiving Water Characteristics:		Dilution:		Toxicity Dilution Series:	
		ZID Fs =	0.1	Biomonitoring dilution:	0.5006567
Receiving Water Name=	*Tigre Coulee*			*Dilution Series Factor:*	*0.75*
Critical flow (Qr) cfs=	0.1	MZ Fs =	1		
Harm. mean/avg tidal cfs=	0	Critical Qr (MGD)=	0.06463		Percent Effluent
Drinking Water=1 HHNPCR=2	1	Harm. Mean (MGD)=	0.06463	Dilution No. 1	66.754%
Marine, 1=y, 0=n		ZID Dilution =	0.9093078	Dilution No. 2	50.0657%
Rec. Water Hardness=	82	MZ Dilution =	0.5006567	Dilution No. 3	37.5493%
Rec. Water TSS=	70	HHnc Dilution=	0.5006567	Dilution No. 4	28.1619%
Fisch/Specific=1,Stream=0		HHc Dilution=	0.5006567	Dilution No. 5	21.1215%
Diffuser Ratio=		ZID Upstream =	0.0997377		
		MZ Upstream =	0.9973765	Partition Coefficients; Dissolved-->Total	
Effluent Characteristics:		MZhhnc Upstream=	0.9973765		
Permittee=	Magnolia Plantation Water System			METALS	FW
Permit Number=	LA0120677, AI127497			Total Arsenic	2.5115333
Facility flow (Qef),MGD=	0.0648	MZhhc Upstream=	0.9973765	Total Cadmium	3.3024873
		ZID Hardness=	---	Chromium III	5.5237244
Outfall Number =	001	MZ Hardness=	---	Chromium VI	1
Eff. data, 2=lbs/day	1	ZID TSS=	---	Total Copper	4.1387652
MQL, 2=lbs/day	1	MZ TSS=	---	Total Lead	7.5490399
Effluent Hardness=	N/A	Multipliers:		Total Mercury	2.5998684
Effluent TSS=	N/A	WLAa --> LTAa	0.32	Total Nickel	4.0450066
WQBL ind. 0=y, 1=n		*WLAc --> LTAc*	0.53	*Total Zinc*	5.4713578
Acute/Chr. ratio 0=n, 1=y	0	LTA a,c-->WQBL avg	1.31		
Aquatic,acute only1=y,0=n		LTA a,c-->WQBL max	3.11	Aquatic Life, Dissolved	
		LTA h --> WQBL max	2.38	Metal Criteria, ug/L	
Page Numbering/Labeling		WQBL-limit/report	2.13	METALS	ACUTE CHRONIC
Appendix	Appendix A-1	WLA Fraction	1	Arsenic	339.8 150
Page Numbers 1=y, 0=n	1	WQBL Fraction	1	Cadmium	25.649088 0.8903321
Input Page # 1=y, 0=n	1			Chromium III	466.42162 151.30235
		Conversions:		Chromium VI	15.712 10.582
Fischer/Site Specific inputs:		ug/L-->lbs/day Qef	0.0005404	Copper	15.28373 10.367953
Pipe=1,Canal=2,Specific=3		ug/L-->lbs/day Qeo	0	Lead	51.997873 2.0262825
Pipe width, feet		ug/L-->lbs/day Qr	0.000834	Mercury	1.734 0.012
ZID plume dist., feet		*lbs/day-->ug/L Qeo*	*1850.3716*	*Nickel*	*1196.6515 132.89774*
MZ plume dist., feet		lbs/day-->ug/L Qef	1850.3716	Zinc	96.734258 88.333047
HHnc plume dist., feet		diss-->tot 1=y0=n	1		
HHc plume dist., feet		Cu diss->tot1=y0=n	1	Site Specific Multiplier Values:	
		cfs-->MGD	0.6463	CV =	---
Fischer/site specific dilutions:				N =	---
Dilution =	---	Receiving Stream:		WLAa --> LTAa	---
F/specific MZ Dilution =	---	Default Hardness=	25	WLAc --> LTAc	---
F/specific HHnc Dilution=	---	Default TSS=	10	LTA a,c-->WQBL avg	---
F/specific HHc Dilution=	---	99 Crit., 1=y, 0=n	1	LTA a,c-->WQBL max	---
				LTA h --> WQBL max	---

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(*1) Toxic Parameters	(*2) Instream Conc. ug/L	(*3) Cu Effluent /Tech (Avg) ug/L	(*4) Effluent /Tech (Max) ug/L	(*5) MQL ug/L	(*6) Effluent 1=No 0=95 %	(*7) 95th % estimate Non-Tech ug/L	(*8) Numerical Criteria Acute FW ug/L	(*9) Chronic FW ug/L	(*10) HHDW ug/L	(*11) HH Carcinogen Indicator "C"
NONCONVENTIONAL										
Total Phenols (4AAP)				5			700	350	5	
3-Chlorophenol				10					0.1	
4-Chlorophenol				10			383	192	0.1	
2,3-Dichlorophenol				10					0.04	
2,5-Dichlorophenol				10					0.5	
2,6-Dichlorophenol				10					0.2	
3,4-Dichlorophenol				10					0.3	
2,4-Dichlorophenocy-acetic acid (2,4-D)				---					100	
2-(2,4,5-Trichlorophen-oxy) propionic acid (2,4,5-TP, Silvex)				---					10	
METALS AND CYANIDE										
Total Arsenic				10			643.51386	284.07027	94.690091	
Total Cadmium				1			28.023886	1.4644384	39.65241	
Chromium III				10			872.32331	282.97266	247.38279	
Chromium VI				10			15.712	10.582	50	C
Total Copper				10			14.435929	10.868022	2892.4889	
Total Lead				5			75.487104	2.9416241	271.88505	
Total Mercury				0.2			5.3768987	0.0372104	6.2017286	
Total Nickel				40			1015.8076	112.81358		
Total Zinc				20			123.54153	112.81215	17470.389	
Total Cyanide				20			45.9	5.2	663.8	
DIOXIN										
2,3,7,8 TCDD; dioxin				1.0E-05					7.1E-07	C
VOLATILE COMPOUNDS										
Benzene				10			2249	1125	1.1	C
Bromoform				10			2930	1465	3.9	C
Bromodichloromethane				10					0.2	C
Carbon Tetrachloride				10			2730	1365	0.22	C
Chloroform				10			2890	1445	5.3	C
Dibromochloromethane				10					0.39	C
1,2-Dichloroethane				10			11800	5900	0.36	C
1,1-Dichloroethylene				10			1160	580	0.05	C
1,3-Dichloropropylene				10			606	303	9.86	
Ethylbenzene				10			3200	1600	2390	
Methyl Chloride				50			55000	27500		
Methylene Chloride				20			19300	9650	4.4	C
1,1,2,2-Tetrachloro-ethane				10			932	466	0.16	C

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(*1) Toxic Parameters	(*12) WLAa Acute	(*13) WLAc Chronic	(*14) WLAh HHDW	(*15) LTAa Acute	(*16) LTAc Chronic	(*17) LTAh HHDW	(*18) Limiting A,C,HH	(*19) WQBL Avg 001	(*20) WQBL Max 001	(*21) WQBL Avg 001	(*22) WQBL Max 001	(*23) Need WQBL?
	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	lbs/day	lbs/day	
NONCONVENTIONAL												
Total Phenols (4AAP)	769.81636	699.08179	9.9868827	246.34123	370.51335	9.9868827	9.9868827	9.9868827	23.768781	0.0053972	0.0128454	no
3-Chlorophenol	---	---	0.1997377	---	---	0.1997377	0.1997377	0.1997377	0.4753756	0.0001079	0.0002569	no
4-Chlorophenol	421.19952	383.4963	0.1997377	134.78385	203.25304	0.1997377	0.1997377	0.1997377	0.4753756	0.0001079	0.0002569	no
2,3-Dichlorophenol	---	---	0.0798951	---	---	0.0798951	0.0798951	0.0798951	0.1901502	4.318E-05	0.0001028	no
2,5-Dichlorophenol	---	---	0.9986883	---	---	0.9986883	0.9986883	0.9986883	2.3768781	0.0005397	0.0012845	no
2,6-Dichlorophenol	---	---	0.3994753	---	---	0.3994753	0.3994753	0.3994753	0.9507512	0.0002159	0.0005138	no
3,4-Dichlorophenol	---	---	0.599213	---	---	0.599213	0.599213	0.599213	1.4261269	0.0003238	0.0007707	no
2,4-Dichlorophenocy-acetic acid (2,4-D)	---	---	199.73765	---	---	199.73765	199.73765	199.73765	475.37562	0.1079446	0.2569082	no
2-(2,4,5-Trichlorophen-oxy) propionic acid (2,4,5-TP, Silvex)	---	---	19.973765	---	---	19.973765	19.973765	19.973765	47.537562	0.0107945	0.0256908	no
METALS AND CYANIDE												
Total Arsenic	707.69642	567.3953	189.13177	226.46286	300.71951	189.13177	189.13177	189.13177	450.13361	0.1022129	0.2432666	no
Total Cadmium	30.818923	2.9250349	79.200793	9.8620554	1.5502685	79.200793	1.5502685	2.0308518	4.8213351	0.0010975	0.0026056	no
Chromium III	959.32679	565.20296	494.11658	306.98457	299.55757	494.11658	299.55757	392.42041	931.62404	0.2120765	0.5034794	no
Chromium VI	17.279078	21.136239	99.868827	5.529305	11.202206	99.868827	5.529305	7.2433895	17.196138	0.0039146	0.0092933	no
Total Copper	15.875734	21.707533	5777.3895	5.080235	11.504992	5777.3895	5.080235	6.6551078	15.799531	0.0035966	0.0085386	no
Total Lead	83.016011	5.8755309	543.05682	26.565123	3.1140314	543.05682	3.1140314	4.0793811	9.6846376	0.0022046	0.0052339	no
Total Mercury	5.9131779	0.0743231	12.387187	1.8922169	0.0393913	12.387187	0.0393913	0.0516025	0.1225068	2.789E-05	6.621E-05	no
Total Nickel	1117.1218	225.33119	---	357.47898	119.42553	---	119.42553	156.44745	371.41341	0.0845492	0.2007237	no
Total Zinc	135.86327	225.32835	34894.946	43.476248	119.42402	34894.946	43.476248	56.953884	135.21113	0.0307797	0.0730724	no
Total Cyanide	50.477958	10.386358	1325.8585	16.152947	5.5047698	1325.8585	5.5047698	7.2112484	17.119834	0.0038972	0.0092521	no
DIOXIN												
2,3,7,8 TCDD; dioxin	---	---	1.418E-06	---	---	1.418E-06	1.418E-06	1.418E-06	3.375E-06	7.664E-10	1.824E-09	no
VOLATILE COMPOUNDS												
Benzene	2473.31	2247.0486	2.1971142	791.4592	1190.9358	2.1971142	2.1971142	2.1971142	5.2291318	0.0011874	0.002826	no
Bromoform	3222.2313	2926.1566	7.7897685	1031.114	1550.863	7.7897685	7.7897685	7.7897685	18.539649	0.0042098	0.0100194	no
Bromodichloromethane	---	---	0.3994753	---	---	0.3994753	0.3994753	0.3994753	0.9507512	0.0002159	0.0005138	no
Carbon Tetrachloride	3002.2838	2726.419	0.4394228	960.73081	1445.0021	0.4394228	0.4394228	0.4394228	1.0458264	0.0002375	0.0005652	no
Chloroform	3178.2418	2886.2091	10.586096	1017.0374	1529.6908	10.586096	10.586096	10.586096	25.194908	0.0057211	0.0136161	no
Dibromochloromethane	---	---	0.7789769	---	---	0.7789769	0.7789769	0.7789769	1.8539649	0.000421	0.0010019	no
1,2-Dichloroethane	12976.904	11784.522	0.7190556	4152.6094	6245.7965	0.7190556	0.7190556	0.7190556	1.7113522	0.0003886	0.0009249	no
1,1-Dichloroethylene	1275.6957	1158.4784	0.0998688	408.22262	613.99355	0.0998688	0.0998688	0.0998688	0.2376878	5.397E-05	0.0001285	no
1,3-Dichloropropylene	666.44102	605.20509	19.694133	213.26113	320.7587	19.694133	19.694133	19.694133	46.872036	0.0106433	0.0253311	no
Ethylbenzene	3519.1605	3195.8025	4773.7299	1126.1314	1693.7753	4773.7299	1126.1314	1475.2321	3502.2685	0.7972626	1.892738	no
Methyl Chloride	60485.571	54927.855	---	19355.383	29111.763	---	19355.383	25355.551	60195.24	13.702951	32.531434	no
Methylene Chloride	21224.937	19274.684	8.7884568	6791.9798	10215.582	8.7884568	8.7884568	8.7884568	20.916527	0.0047496	0.011304	no
1,1,2,2-Tetrachloro-ethane	1024.9555	930.77747	0.3195802	327.98576	493.31206	0.3195802	0.3195802	0.3195802	0.760601	0.0001727	0.0004111	no

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(*1) Toxic Parameters	(*2) Instream Conc. ug/L	(*3) Cu Effluent /Tech (Avg) ug/L	(*4) Effluent /Tech (Max) ug/L	(*5) MQL ug/L	(*6) Effluent 1=No 95% 0=95 %	(*7) 95th % estimate Non-Tech ug/L	(*8) Numerical Criteria Acute FW ug/L	(*9) Chronic FW ug/L	(*10) HHDW ug/L	(*11) HH Carcinogen Indicator "C"
VOLATILE COMPOUNDS (cont'd)										
Tetrachloroethylene				10			1290	645	0.65	C
Toluene				10			1270	635	6100	
1,1,1-Trichloroethane				10			5280	2640	200	
1,1,2-Trichloroethane				10			1800	900	0.56	C
Trichloroethylene				10			3900	1950	2.8	C
Vinyl Chloride				10					1.9	C
ACID COMPOUNDS										
2-Chlorophenol				10			258	129	0.1	
2,4-Dichlorophenol				*10*			*202*	*101*	*0.3*	
BASE NEUTRAL COMPOUNDS										
Benzidine				50			250	125	0.00008	C
Hexachlorobenzene				10					0.00025	C
Hexachlorabutadiene				10			5.1	1.02	0.09	C
PESTICIDES										
Aldrin				0.05			3		0.00004	C
Hexachlorocyclohexane (gamma BHC, Lindane)				0.05			5.3	0.21	0.11	C
Chlordane				0.2			2.4	0.0043	0.00019	C
4,4'-DDT				0.1			1.1	0.001	0.00019	C
4,4'-DDE				0.1			52.5	10.5	0.00019	C
4,4'-DDD				0.1			0.03	0.006	0.00027	C
Dieldrin				0.1			0.2374	0.0557	0.00005	C
Endosulfan				0.1			0.22	0.056	0.47	
Endrin				0.1			0.0864	0.0375	0.26	
Heptachlor				0.05			0.52	0.0038	0.00007	C
Toxaphene				5			0.73	0.0002	0.00024	C
Other Parameters:										
Fecal Col.(col/100ml)										
Chlorine							19	11		
Ammonia								4000		
Chlorides		4765000	8350000		1			600000		
Sulfates										
TDS										

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(*1) Toxic Parameters	(*12) WLAa Acute ug/L	(*13) WLAc Chronic ug/L	(*14) WLAh HHDW ug/L	(*15) LTAa Acute ug/L	(*16) LTAc Chronic ug/L	(*17) LTAh HHDW ug/L	(*18) Limiting A,C,HH ug/L	(*19) WQBL Avg 001 ug/L	(*20) WQBL Max 001 ug/L	(*21) WQBL Avg 001 lbs/day	(*22) WQBL Max 001 lbs/day	(*23) Need WQBL?
Tetrachloroethylene	1418.6616	1288.3079	1.2982948	453.9717	682.80317	1.2982948	1.2982948	1.2982948	3.0899415	0.0007016	0.0016699	no
Toluene	1396.6668	1268.3341	12183.997	446.93338	672.21708	12183.997	446.93338	585.48273	1389.9628	0.3164136	0.7511804	no
1,1,1-Trichloroethane	5806.6148	5273.0741	399.47531	1858.1167	2794.7293	399.47531	399.47531	399.47531	950.75123	0.2158892	0.5138164	no
1,1,2-Trichloroethane	1979.5278	1797.6389	1.1185309	633.44889	952.74861	1.1185309	1.1185309	1.1185309	2.6621035	0.0006045	0.0014387	no
Trichloroethylene	4288.9769	3894.8843	5.5926543	1372.4726	2064.2887	5.5926543	5.5926543	5.5926543	13.310517	0.0030224	0.0071934	no
Vinyl Chloride	---	---	3.7950154	---	---	3.7950154	3.7950154	3.7950154	9.0321367	0.0020509	0.0048813	no
ACID COMPOUNDS												
2-Chlorophenol	283.73231	257.66157	0.1997377	90.794341	136.56063	0.1997377	0.1997377	0.1997377	0.4753756	0.0001079	0.0002569	no
2,4-Dichlorophenol	222.14701	201.73503	0.599213	71.087042	106.91957	0.599213	0.599213	0.599213	1.4261269	0.0003238	0.0007707	no
BASE NEUTRAL COMPOUNDS												
Benzidine	274.93441	249.67207	0.0001598	87.979012	132.3262	0.0001598	0.0001598	0.0001598	0.0003803	8.636E-08	2.055E-07	no
Hexachlorobenzene	---	---	0.0004993	---	---	0.0004993	0.0004993	0.0004993	0.0011884	2.699E-07	6.423E-07	no
Hexachlorabutadiene	5.608662	2.0373241	0.1797639	1.7947719	1.0797818	0.1797639	0.1797639	0.1797639	0.4278381	9.715E-05	0.0002312	no
PESTICIDES												
Aldrin	3.299213	---	7.99E-05	1.0557481	---	7.99E-05	7.99E-05	7.99E-05	0.0001902	4.318E-08	1.028E-07	no
Hexachlorocyclohexane (gamma BHC, Lindane)	5.8286096	0.4194491	0.2197114	1.8651551	0.222308	0.2197114	0.2197114	0.2197114	0.5229132	0.0001187	0.0002826	no
Chlordane	2.6393704	0.0085887	0.0003795	0.8445985	0.004552	0.0003795	0.0003795	0.0003795	0.0009032	2.051E-07	4.881E-07	no
4,4'-DDT	1.2097114	0.0019974	0.0003795	0.3871077	0.0010586	0.0003795	0.0003795	0.0003795	0.0009032	2.051E-07	4.881E-07	no
4,4'-DDE	57.736227	20.972454	0.0003795	18.475593	11.1154	0.0003795	0.0003795	0.0003795	0.0009032	2.051E-07	4.881E-07	no
4,4'-DDD	0.0329921	0.0119843	0.0005393	0.0105575	0.0063517	0.0005393	0.0005393	0.0005393	0.0012835	2.915E-07	6.937E-07	no
Dieldrin	0.2610777	0.1112539	9.987E-05	0.0835449	0.0589646	9.987E-05	9.987E-05	9.987E-05	0.0002377	5.397E-08	1.285E-07	no
Endosulfan	0.2419423	0.1118531	0.938767	0.0774215	0.0592821	0.938767	0.0592821	0.0776596	0.1843674	4.197E-05	9.964E-05	no
Endrin	0.0950173	0.0749016	0.5193179	0.0304055	0.0396979	0.5193179	0.0304055	0.0398313	0.0945613	2.153E-05	5.11E-05	no
Heptachlor	0.5718636	0.00759	0.0001398	0.1829963	0.0040227	0.0001398	0.0001398	0.0001398	0.0003328	7.556E-08	1.798E-07	no
Toxaphene	0.8028085	0.0003995	0.0004794	0.2568987	0.0002117	0.0004794	0.0002117	0.0002774	0.0006585	1.499E-07	3.559E-07	no
Other Parameters:												
Fecal Col.(col/100ml)	---	---	---	---	---	---	---	---	---	---	---	no
Chlorine	20.895015	21.971142	---	6.6864049	11.644705	---	6.6864049	8.7591905	20.794719	0.0047337	0.0112381	no
Ammonia	---	7989.5062	---	---	4234.4383	---	4234.4383	5547.1141	13169.103	2.997838	7.1170047	no
Chlorides	---	1198425.9	---	---	635165.74	---	635165.74	832067.12	1975365.5	449.6757	1067.5507	yes
Sulfates	---	---	---	---	---	---	---	---	---	---	---	no
TDS	---	---	---	---	---	---	---	---	---	---	---	no
	---	---	---	---	---	---	---	---	---	---	---	no
	---	---	---	---	---	---	---	---	---	---	---	no

APPENDIX A-2 LA0120677, AI No. 127497

Documentation and Explanation of Water Quality Screen
and Associated Lotus Spreadsheet

Each reference column is marked by a set of parentheses enclosing a number and asterisk, for example (*1) or (*19). These columns represent inputs, existing data sets, calculation points, and results for determining Water Quality Based Limits for an effluent of concern. The following represents a summary of information used in calculating the water quality screen:

Receiving Water Characteristics:

Receiving Water: Tigre Coulee via local drainage; thence into Bayou Tigre
Critical Flow, Qrc (cfs): 0.1 cfs
Harmonic Mean Flow, Qrh (cfs): 0 cfs
Segment No.: 060903
Receiving Stream Hardness (mg/L): 82 mg/l
Receiving Stream TSS (mg/L): 70 mgl
MZ Stream Factor, Fs: 1
Plume distance, Pf: N/A

Effluent Characteristics:

Company:Magnolia Plantation Water System
Facility flow, Qe (MGD): 0.0648 MGD
Effluent Hardness: N/A
Effluent TSS: N/A
Pipe/canal width, Pw: N/A
Permit Number: LA0120677

Variable Definition:
Qrc, critical flow of receiving stream, cfs
Qrh, harmonic mean flow of the receiving stream, cfs
Pf = Allowable plume distance in feet, specified in LAC 33.IX.1115.D
Pw = Pipe width or canal width in feet
Qe, total facility flow , MGD
Fs, stream factor from LAC.IX.33.11 (1 for harmonic mean flow)
Cu, ambient concentration, ug/L
Cr, numerical criteria from LAC.IX.1113, Table 1
WLA, wasteload allocation
LTA, long term average calculations
WQBL, effluent water quality based limit
ZID, Zone of Initial Dilution in % effluent
MZ, Mixing Zone in % effluent

Formulas used in aquatic life water quality screen (dilution type WLA):

Streams:

$$\text{Dilution Factor} = \frac{Qe}{(Qrc \times 0.6463 \times Fs + Qe)}$$

$$WLA\ a,c,h = \frac{Cr}{\text{Dilution Factor}} - \frac{(Fs \times Qrc \times 0.6463 \times Cu)}{Qe}$$

Static water bodies (in the absence of a site specific dilution):

Discharge from a pipe:

$$\text{Critical Dilution} = \frac{(2.8)\ Pw\ \pi^{1/2}}{Pf}$$

$$WLA = \frac{(Cr-Cu)\ Pf}{(2.8)\ Pw\ \pi^{1/2}}$$

Discharge from a canal:

$$\text{Critical Dilution} = \frac{(2.38)(Pw^{1/2})}{(Pf)^{1/2}}$$

$$WLA = \frac{(Cr-Cu)\ Pf^{1/2}}{2.38\ Pw^{1/2}}$$

Formulas used in human health water quality screen, human health non-carcinogens (dilution type WLA):

Streams:

$$\text{Dilution Factor} = \frac{Qe}{(Qrc \times 0.6463 + Qe)}$$

$$WLA\ a,c,h = \frac{Cr}{\text{Dilution Factor}} - \frac{(Qrc \times 0.6463 \times Cu)}{Qe}$$

Formulas used in human health water quality screen, human health carcinogens (dilution type WLA):

$$\text{Dilution Factor} = \frac{Qe}{(Qrh \times 0.6463 + Qe)}$$

$$WLA\ a,c,h = \frac{Cr}{\text{Dilution Factor}} - \frac{(Qrh \times 0.6463 \times Cu)}{Qe}$$

Static water bodies in the absence of a site specific dilution (human health carcinogens and human health non-carcinogens):

Discharge from a pipe:

$$\text{Critical Dilution} = \frac{(2.8)\ Pw\ \pi^{1/2}}{Pf}$$

$$WLA = \frac{(Cr-Cu)\ Pf^{*}}{(2.8)\ Pw\ \pi^{1/2}}$$

Discharge from a canal:

$$\text{Critical Dilution} = \frac{(2.38)(Pw^{1/2})}{(Pf)^{1/2}}$$

$$WLA = \frac{(Cr-Cu)\ Pf^{1/2*}}{2.38\ Pw^{1/2}}$$

* Pf is set equal to the mixing zone distance specified in LAC 33:IX.1115 for the static water body type, i.e., lake, estuary, Gulf of Mexico, etc.

If a site specific dilution is used, WLA are calculated by subtracting Cu from Cr and dividing by the site specific dilution for human health and aquatic life criteria.

$$WLA = \frac{(Cr-Cu)}{\text{site specific dilution}}$$

Longterm Average Calculations:
LTAa = WLAa X 0.32
LTAc = WLAc X 0.53
LTAh = WLAh

WQBL Calculations:
Select most limiting LTA to calculate daily max and monthly avg WQBL

If aquatic life LTA is more limiting:
Daily Maximum = Min(LTAa, LTAc) X 3.11
Monthly Average = Min(LTAc, LTAc) X 1.31

If human health LTA is more limiting:
Daily Maximum = LTAh X 2.38
Monthly Average = LTAh

Mass Balance Formulas:

mass (lbs/day): (ug/L) X 1/1000 X (flow, MGD) X 8.34 = lbs/day

$$\text{concentration(ug/L)}: \frac{\text{lbs/day}}{\text{(flow, MGD) X 8.34 X 1/1000}} = \text{ug/L}$$

The following is an explanation of the references in the spreadsheet.

(*1) Parameter being screened.
(*2) Instream concentration for the parameter being screened in ug/L. In the absence of accurate supporting data, the instream concentration is assumed to be zero (0).
(*3) Monthly average effluent or technolgy value in concentration units of ug/L or mass units of lbs/day. Units determined on a case-by-case basis as appropriate to the particular situation.
(*4) Daily maximum technology value in concentration units of ug/L or mass units of lbs/day. Units determined on a case-by-case basis as appropriate to the particular situation.
(*5) Minimum analytical Quantification Levels (MQL's). Established in a letter dated January 27, 1994 from Wren Stenger of EPA Region 6 to Kilren Vidrine of LDEQ and from the "Permitting Guidance Document for Implementing Louisiana Surface Water Quality Standards". The applicant must test for the parameter at a level at least as sensitive as the specified MQL. If this is not done, the MQL becomes the application value for screening purposes if the pollutant is suspected to be present

on-site and/or in the waste stream. Units are in ug/l or lbs/day depending on the units of the effluent data.

(*6) States whether effluent data is based on 95th percentile estimation. A "1" indicates that a 95th percentile approximation is being used, a "0" indicates that no 95th percentile approximation is being used.

(*7) 95th percentile approximation multiplier (2.13). The constant, 2.13, was established in memorandum of understanding dated October 8, 1991 from Jack Ferguson of Region 6 to Jesse Chang of LDEQ and included in the "Permitting Guidance Document for Implementing Louisiana Surface Water Quality Standards". This value is screened against effluent Water Quality Based Limits established in columns (*18) - (*21). Units are in ug/l or lbs/day depending on the units of the measured effluent data.

(*8) LAC 33.IX.1113.C.6, Table 1, Numerical Criteria for Specific Toxic Substances, freshwater (FW) or marine water (MW) (whichever is applicable) aquatic life protection, acute criteria. Units are specified. Some metals are hardness dependent. The hardness of the receiving stream shall generally be used, however a flow weighted hardness may be determined in site-specific situations. Dissolved metals are converted to Total metals using partition coefficients in accordance with the "Permitting Guidance Document for Implementing Louisiana Surface Water Quality Standards". Similar to hardness, the TSS of the receiving stream shall generally be used, however, a flow weighted TSS may be determined in site-specific situations.

Hardness Dependent Criteria:

Metal	Formula
Cadmium	$e^{(1.1280[\ln(\text{hardness})] - 1.6774)}$
Chromium III	$e^{(0.8190[\ln(\text{hardness})] + 3.6880)}$
Copper	$e^{(0.9422[\ln(\text{hardness})] - 1.3884)}$
Lead	$e^{(1.2730[\ln(\text{hardness})] - 1.4600)}$
Nickel	$e^{(0.8460[\ln(\text{hardness})] + 3.3612)}$
Zinc	$e^{(0.8473[\ln(\text{hardness})] + 0.8604)}$

Dissolved to Total Metal Multipliers for Freshwater Streams (TSS dependent):

Metal	Multiplier
Arsenic	$1 + 0.48 \times TSS^{-0.73} \times TSS$
Cadmium	$1 + 4.00 \times TSS^{-1.13} \times TSS$
Chromium III	$1 + 3.36 \times TSS^{-0.93} \times TSS$
Copper	$1 + 1.04 \times TSS^{-0.74} \times TSS$
Lead	$1 + 2.80 \times TSS^{-0.80} \times TSS$
Mercury	$1 + 2.90 \times TSS^{-1.14} \times TSS$
Nickel	$1 + 0.49 \times TSS^{-0.57} \times TSS$
Zinc	$1 + 1.25 \times TSS^{-0.70} \times TSS$

Dissolved to Total Metal Multipliers for Marine Environments (TSS dependent):

Metal	Multiplier

Copper	$1 + (10^{4.86} \times TSS^{-0.72} \times TSS) \times 10^{-6}$
Lead	$1 + (10^{6.06} \times TSS^{-0.85} \times TSS) \times 10^{-6}$
Zinc	$1 + (10^{5.36} \times TSS^{-0.52} \times TSS) \times 10^{-6}$

If a metal does not have multiplier listed above, then the dissolved to total metal multiplier shall be 1.

(*9) LAC 33.IX.1113.C.6, Table 1, Numerical Criteria for Specific Toxic Substances, freshwater (FW) or marine water (MW) (whichever is applicable) aquatic life protection, chronic criteria. Units are specified. Some metals are hardness dependent. The hardness of the receiving stream shall generally be used, however a flow weighted hardness may be determined in site-specific situations. Dissolved metals are converted to Total metals using partition coefficients in accordance with the "Permitting Guidance Document for Implementing Louisiana Surface Water Quality Standards". Similar to hardness, the TSS of the receiving stream shall generally be used, however, a flow weighted TSS may be determined in site-specific situations.
Hardness dependent criteria:

Metal	Formula
Cadmium	$e^{(0.7852[\ln(\text{hardness})] - 3.4900)}$
Chromium III	$e^{(0.8473[\ln(\text{hardness})] + 0.7614)}$
Copper	$e^{(0.8545[\ln(\text{hardness})] - 1.3860)}$
Lead	$e^{(1.2730[\ln(\text{hardness})] - 4.7050)}$
Nickel	$e^{(0.8460[\ln(\text{hardness})] + 1.1645)}$
Zinc	$e^{(0.8473[\ln(\text{hardness})] + 0.7614)}$

Dissolved to total metal multiplier formulas are the same as (*8), acute numerical criteria for aquatic life protection.

(*10) LAC 33.IX.1113.C.6, Table 1, Numerical Criteria for Specific Toxic Substances, human health protection, drinking water supply (HHDW), non-drinking water supply criteria (HHNDW), or human health non-primarry contact recreation (HHNPCR) (whichever is applicable). A DEQ and EPA approved Use Attainability Analysis is required before HHNPCR is used, e.g., Monte Sano Bayou. Units are specified.

(*11) C if screened and carcinogenic. If a parameter is being screened and is carcinogenic a "C" will appear in this column.

(*12) Wasteload Allocation for acute aquatic criteria (WLAa). Dilution type WLAa is calculated in accordance with the "Permitting Guidance Document for Implementing Louisiana Surface Water Quality Standards". Negative values indicate that the receiving water is not meeting the acute aquatic numerical criteria for that parameter. Units are in ug/L.
Dilution WLAa formulas for streams:

$$WLAa = (Cr/\text{Dilution Factor}) - \frac{(Fs \times Orc \times 0.6463 \times Cu)}{Qe}$$

Dilution WLAa formulas for static water bodies:
WLAa = (Cr-Cu)/Dilution Factor)
Cr represents aquatic acute numerical criteria from column (*8).
If Cu data is unavailable or inadequate, assume Cu=0.

If water quality standards are being applied at end-of-pipe, such as in the case of certain TMDL's, then a blank shall appear in this column.

(*13) Wasteload Allocation for chronic aquatic criteria (WLAc). Dilution type WLAc is calculated in accordance with the "Permitting Guidance Document for Implementing Louisiana Surface Water Quality Standards". Negative values indicate that the receiving water is not meeting the chronic aquatic numerical criteria for that parameter. Units are in ug/L.
Dilution WLAc formula:

$$WLAc = (Cr/\text{Dilution Factor}) - \frac{(Fs \times Qrc \times 0.6463 \times Cu)}{Qe}$$

Dilution WLAc formulas for static water bodies:
WLAc = (Cr-Cu)/Dilution Factor)
Cr represents aquatic chronic numerical criteria from column (*9).
If Cu data is unavailable or inadequate, assume Cu=0.
If water quality standards are being applied at end-of-pipe, such as in the case of certain TMDL's, then a blank shall appear in this column.

(*14) Wasteload Allocation for human health criteria (WLAh). Dilution type WLAh is calculated in accordance with the "Permitting Guidance Document for Implementing Louisiana Surface Water Quality Standards". Negative values indicate that the receiving water is not meeting the human health numerical criteria for that parameter. Units are in ug/L. Dilution WLAh formula:

$$WLAh = (Cr/\text{Dilution Factor}) - \frac{(Fs \times Qrc,Qrh \times 0.6463 \times Cu)}{Qe}$$

Dilution WLAh formulas for static water bodies:
WLAh = (Cr-Cu)/Dilution Factor)
Cr represents human health numerical criteria from column (*10).
If Cu data is unavailable or inadequate, assume Cu=0.
If water quality standards are being applied at end-of-pipe, such as in the case of certain TMDL's, then a blank shall appear in this column.

(*15) Long Term Average for aquatic numerical criteria (LTAa). WLAa numbers are multiplied by a multiplier specified in the "Permitting Guidance Document for Implementing Louisiana Surface Water Quality Standards" which is 0.32. WLAa X 0.32 = LTAa.
If water quality standards are being applied at end-of-pipe, such as in the case of certain TMDL's, then a blank shall appear in this column.

(*16) Long Term Average for chronic numerical criteria (LTAc). WLAc numbers are multiplied by a multiplier specified in the "Permitting Guidance Document for Implementing Louisiana Surface Water Quality Standards" which is 0.53. WLAc X 0.53 = LTAc.
If water quality standards are being applied at end-of-pipe, such as in the case of certain TMDL's, then a blank shall appear in this column.

(*17) Long Term Average for human health numerical criteria (LTAh). WLAh numbers are multiplied by a multiplier specified in the "Permitting Guidance Document for Implementing Louisiana Surface Water Quality Standards" which is 1. WLAc X 1 = LTAh.
If water quality standards are being applied at end-of-pipe, such as in the case of certain TMDL's, then a blank shall appear in this column.

(*18) Limiting Acute, Chronic or Human Health LTA's. The most limiting LTA is placed in this column. Units are consistent with the WLA calculation. If standards are being applied at end-of-pipe, such as in the case of certain TMDL's, then the type of limit, Aquatic or Human Health (HH), is indicated.

(*19) End of pipe Water Quality Based Limit (WQBL) monthly average in terms of concentration, ug/L. If aquatic life criteria was the most limiting LTA then the limiting LTA is multiplied by 1.31 to determine the average WQBL ($LTA_{limiting\ aquatic}$ X 1.31 = $WQBL_{monthly\ average}$). If human health criteria was the most limiting criteria then LTAh = $WQBL_{monthly\ average}$. If water quality standards are being applied at end-of-pipe, such as in the case of certain TMDL's, then either the human health criteria or the chronic aquatic life criteria shall appear in this column depending on which is more limiting.

(*20) End of pipe Water Quality Based Limit (WQBL) daily maxium in terms of concentration, ug/L. If aquatic life criteria was the most limiting LTA then the limiting LTA is multiplied by 3.11 to determine the daily maximum WQBL ($LTA_{limiting\ aquatic}$ X 3.11 = $WQBL_{daily\ max}$). If human health criteria was the most limiting criteria then LTAh is multiplied by 2.38 to determine the daily maximum WQBL ($LTA_{limiting\ aquatic}$ X 2.38 = $WQBL_{daily\ max}$). If water quality standards are being applied at end-of-pipe, such as in the case of certain TMDL's, then either the human health criteria or the acute aquatic life criteria shall appear in this column depending on which is more limiting.

(*21) End of pipe Water Quality Based Limit (WQBL) monthly average in terms of mass, lbs/day. The mass limit is determined by using the mass balance equations above. Monthly average WQBL, ug/l/1000 X facility flow, MGD X 8.34 = monthly average WQBL, lbs/day.

(*22) End of pipe Water Quality Based Limit (WQBL) monthly average in terms of mass, lbs/day. Mass limit is determined by using the mass balance equations above. Daily maximum WQBL, ug/l/1000 X facility flow, MGD X 8.34 = daily maximum WQBL, lbs/day.

(*23) Indicates whether the screened effluent value(s) need water quality based limits for the parameter of concern. A "yes" indicates that a water quality based limit is needed in the permit; a "no" indicates the reverse.